



# GREEN INFRASTRUCTURE

## FOR THE URBAN AND NATURAL SYSTEM OF RAVINES.

Coexistence of public space in overcrowded conditions?



Country / City	Chile / Valdivia
University / School	Universidad Central de Chile / Architecture and Landscape School
Academic year	2019
Title of the project	Green infrastructure for the urban and natural system of ravines.
Authors	Jennifer Andrea Moya Pérez

## TECHNICAL DOSSIER

Title of the project	Green infrastructure for the urban and natural system of ravines.
Authors	Jennifer Andrea Moya Pérez
Title of the course	Independent Thesis
Academic year	2018 - 2019
Teaching Staff	Jadille A. Mussa - Ana Maria Wegmann - Francisca F. Fernandez
Department/Section/Program of belonging	School of Architecture, Department of Landscape Architecture
University/School	Universidad Central de Chile / Architecture and Landscape School



Written statement, short description of the project in English, no more than 250 words

Universidad Central de Chile / Architecture and Landscape School

The green infrastructure project addresses ravines; urban voids; streets with potential for public space. The social leaders of the study area indicate that they want to use the ravines (as public space), but they do not know how, they do not have the resources, tools or knowledge to organize these spaces.

The ravines are natural corridors of biodiversity. Furthermore, they have the potential to offer social functions such as recreation spaces, contact with nature, hiking and learning. The effects caused by a neglected urbanization end up altering its operation and suppressing the ecological services they provide.

Systems theory is used to make a project analogy (Bertalanffy, 1976). We will understand the ravines and the urbanization as two complex systems. To strengthen a system, it is necessary to generate connection networks, which are non-existent or diffuse in the study area, that connection generates a link between these systems, strengthening them.

In the study area there are two different systems, the urban system and the natural ravine system, both share a territory, which is their common objective, but without any link to achieve a dynamic balance in the landscape, in which they must coexist. In order for this coexistence to be harmoniously possible, the objective was to create a link between the urban system and the natural system of ravines.

and this link is the green infrastructure that mediates between the urban system and the natural ravines system, as a regulatory mechanism that mitigates the risk of imbalance.

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# CLIMATE CHANGE AGAIN

11th International Biennial Landscape Barcelona

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SCHOOL PRIZE

# GREEN INFRASTRUCTURE DIAGNOSIS FOR THE URBAN AND NATURAL SYSTEM OF RAVINES



## General context

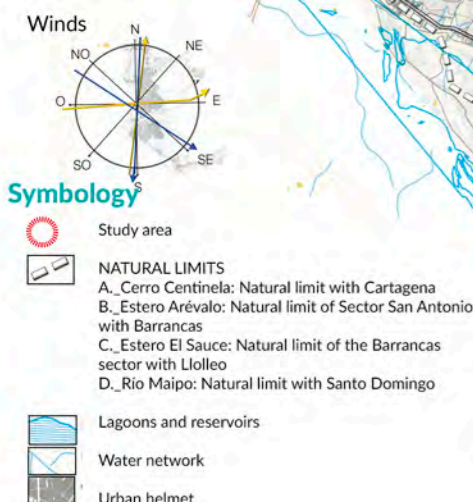
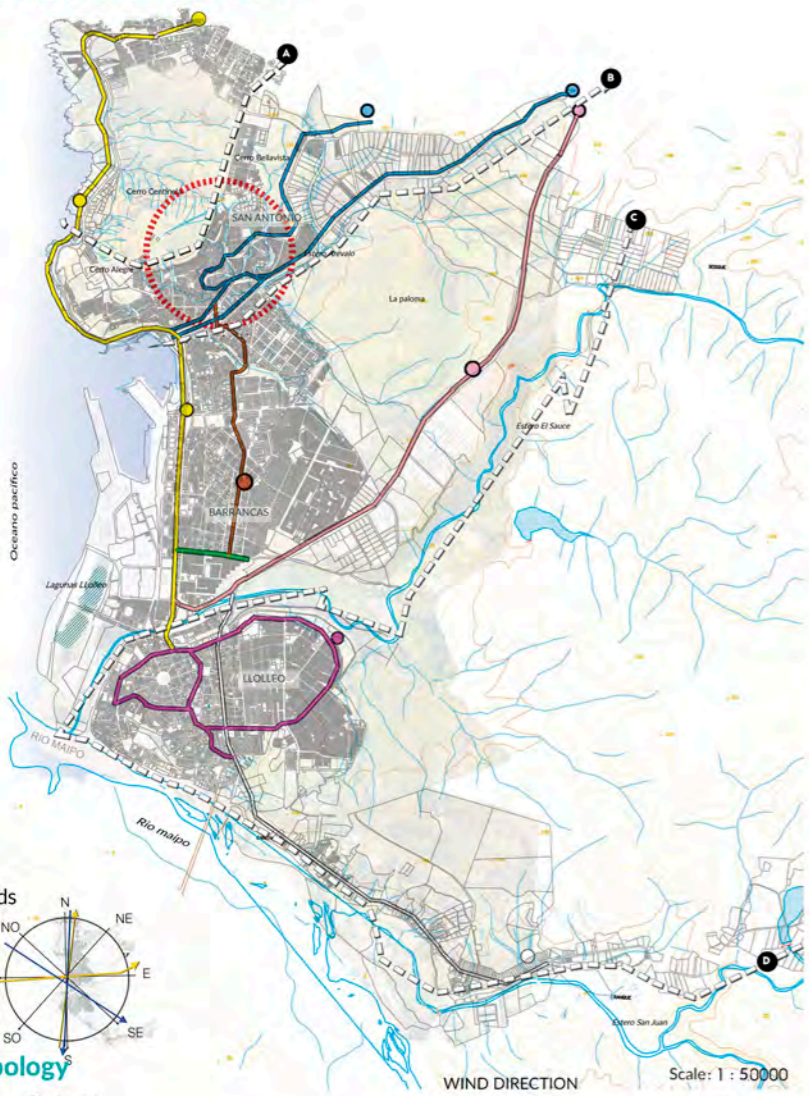


## Commune of san antonio



**NOTE:** Of the total population of the commune, 95.3% (95,168 inhabitants) are concentrated within the urban area, while 4.7% (4,700 inhabitants) according to INE estimates for 2012, live in the rural area.

## Urban area of San Antonio



## Current situation: Green areas

**DEFINITION:** Green infrastructure as a strategically planned network of high-quality natural and semi-natural areas with other environmental elements, designed and managed to provide a wide range of ecosystem services and protect biodiversity. (European Union, 2014)

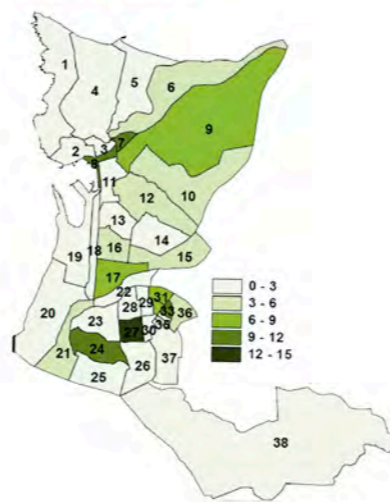
### Consolidated green areas



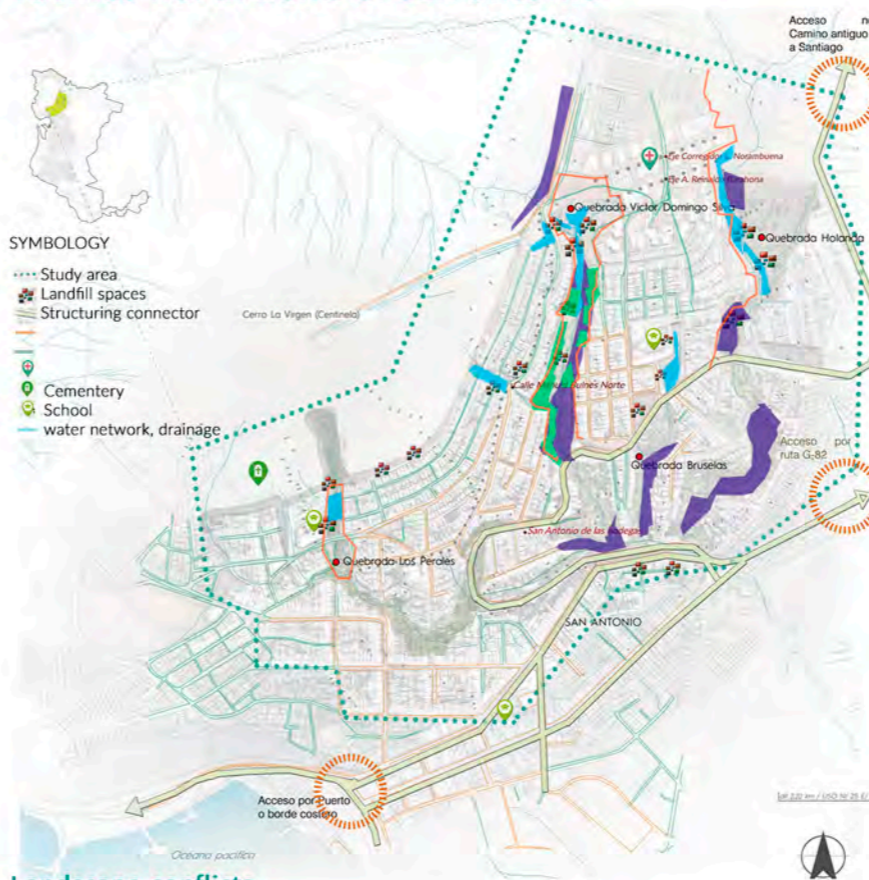
### Potential green infrastructure



### Need for green areas according to sector.



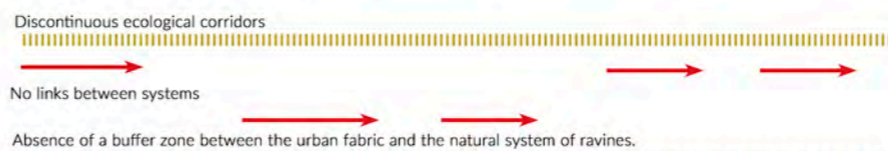
## Study area; Natural and social system of ravines north zone of san antonio



### Landscape conflicts

- Busy streets and bad conditions Informal housing, both for the occupants and the ravines system (due to risks of erosion, fire, etc.).
- Lack of intermediate spaces, between the urban system and the natural system of ravines.
- Landfill contamination
- Protection zones according to PRC.

### PROBLEM A: Discontinuity between ecological and social corridor, weakening of the urban and natural system.



### PROBLEM B: Lack of public spaces and devaluation of potential spaces such as green infrastructure (Slope, residual spaces, streams, pedestrian walks, rough sites, etc.) due to urban pressure.



## Structural problems; Lack of links between systems

The urban system does not recognize the natural structure of streams, nor does the structure of ravines have a link with the urban system, there is a lack of knowledge of the natural matrix structure that makes up the territory, a cause of this occurs sub problems such as: Microbasural, intakes informal, waste of potential elements such as green infrastructure, etc.



### Corridors in the landscape matrix.



In the landscape matrix, 4 ecological corridors that are the ravines are recognized, at this time they are presented as fragments, since there is no connection between them, this weakens this system.

### Human activity creates patches and isolated fragments.



We can see different unused spaces (slope, rough site, edge of the hill) that are used as landfills. At this time they are presented as fragments since there is no connection between them, this weakens the urban system and ravines system.



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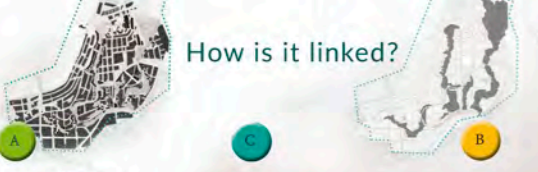
## FOR THE URBAN AND NATURAL SYSTEM OF RAVINES

### Systems theory approach as project analogy.

A system is a set of interactive elements that have a common objective. Therefore, the whole system is made up of a structural aspect (limits, elements, communication and information) and a functional aspect (Von Bertalanffy, 1940). To strengthen a system, it is necessary to create a communication network. That network generates a link between these systems and they are strengthened. In the study area there are two different systems, the urban system and the natural stream system. Their common goal is to share a territory and achieve a dynamic balance in the landscape that must coexist. For this coexistence to be possible, a harmonious link is generated between the urban system and the natural system of the current. For landscape architecture, we will understand it as follows: Green infrastructure would act as a regulatory mechanism, thus fulfilling the role of intermediary between the urban system and the natural ravines system, mitigating the risk of imbalance in the landscape.

### What is linked?

Urban System + Natural ravines system =



### How is it linked?



### the regulatory mechanism between these systems is green infrastructure

### Project objective

Contribute to the conservation of the biodiversity of the coastal ravines in the northern sector of the San Antonio commune, putting them in value as socio-environmental systems, generating green infrastructure that strengthens the connection of the system, mitigates urban pressure.



### Strategy 01 space link

- URBAN CORRIDOR
  - A. Ecosocial urban Corridor Manuel Bulnes
- BUFFER CORRIDOR
  - B. Linear Park Cerro Centinela
- AXIS CORRIDOR
  - C. Corregidor axis corridor L. Norambuena
  - D. Corridor axis A. Reinaldo Barahona

### Strategy 03 social link

- PUBLIC SQUARE
  - O. Púbc Square Victor Domingo Silva
  - P. Public Square Quebrada Los Perales
  - Q. Public Square Bruselas
- BikeWay
  - R. San Antonio De Las Bodegas Bikeway
- Urban park
  - S. Holanda Ecosocial Park

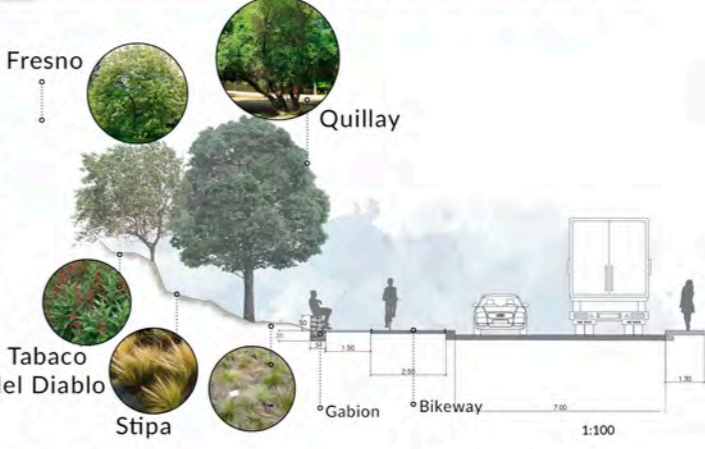
### Strategy 02 landscape link

- TRANSITION SQUARE
  - E. Transition Square Victor Domingo Silva
  - F. Los Perales Transition Square
  - G. Holanda Transition Square
- LOOKOUT SQUARE
  - H. Lookout Square Amapolas
  - I. Lookout Square Los Perales
  - J. Lookout Square Entre Quebradas
  - K. Lookout Square Bruselas
  - L. Lookout park Holanda
- INTERPRETATIVE TRAIL
  - M. Interpretive trail Victor Domingo Silva
- GREEN SLOPE
  - N. Slope Manuel bulnes

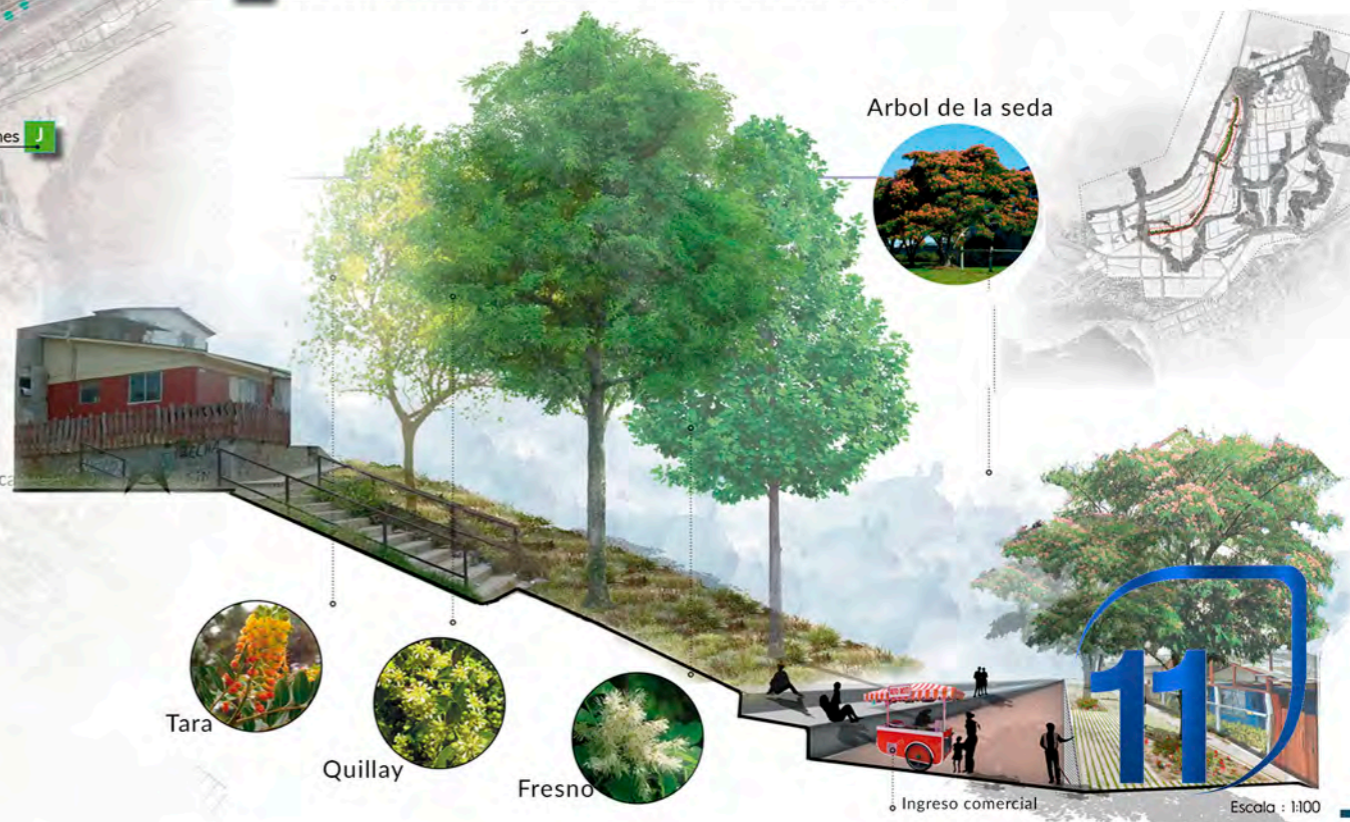


## EXAMPLE OF PROTOTYPE SOLUTIONS FOR THE GREEN INFRASTRUCTURE PROJECT

### R. San Antonio de las bodegas Bikeway



### A. Ecosocial urban Corridor Manuel Bulnes

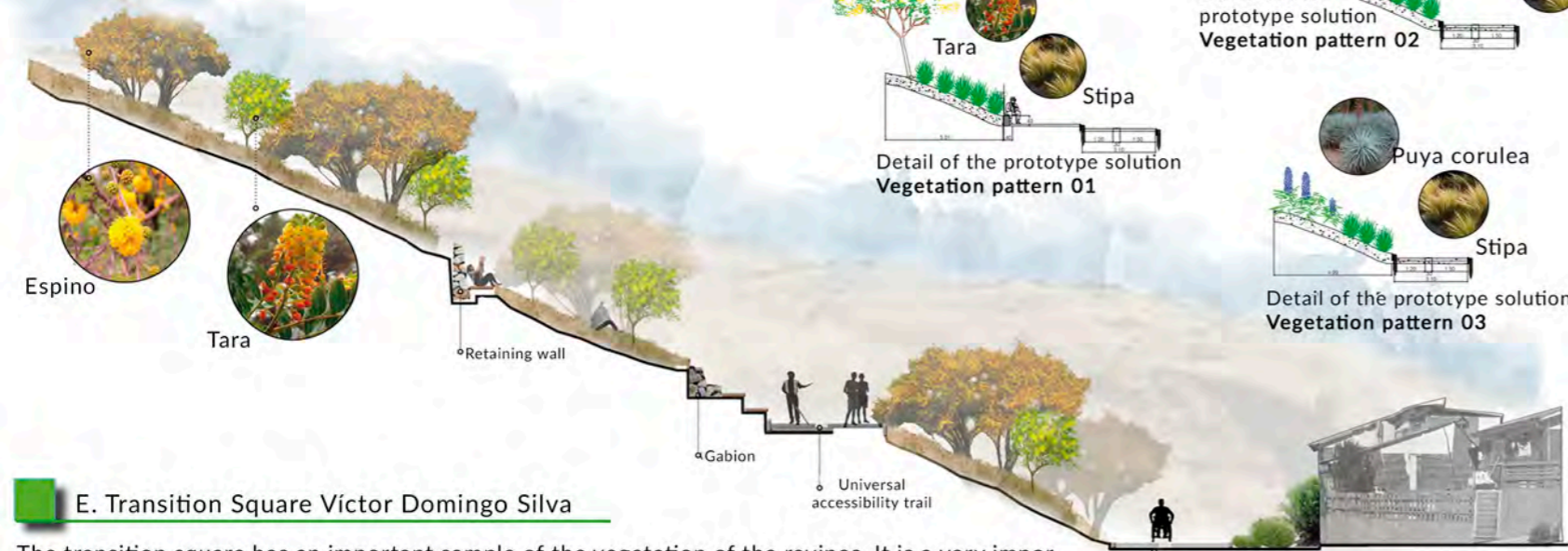


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## FOR THE URBAN AND NATURAL SYSTEM OF RAVINES



### A. Ecosocial urban Corridor Manuel Bulnes



### E. Transition Square Víctor Domingo Silva

The transition square has an important sample of the vegetation of the ravines. It is a very important element of this master plan, since it is a mediator between the human system and the natural system of the ravines, protects the ravine and is for public use. It is a place of learning for the social environment.



### H,I,J,K,L Lookout square

Lookout square are strategically located at the points with the highest visibility in the landscape (according to landscape evaluation). The native vegetation is an important element that gives identity to the landscape



### PLANTS PALETTE

- Arboreal species**
- Shinus latifolius (Molle)
  - Peumus boldus (Boldo)
  - Caesalpinia spinosa (Tara)
  - Quillaja Saponaria (Quillay)
  - Acacia caven (espino)
  - Geoffroea decorticans (chañar)
  - Fraxinus ornus (Fresno de flor)
  - Albizia julibrissin (El árbol de la seda)
- Shrub species**
- Fabiana imbricata (Pichi romero)
  - Berberis chilensis (Michay)
  - Lobelia polyphylla (Tabaco del diablo)
  - Lobelia tupa (Tabaco del diablo)
  - Puya coerulea (Chagualillo)
  - Puya chilensis (Puya, Chagual)
  - Geum magellanicum (Hierba del clavo)
  - Pasithea coerulea (Azulillo)
  - Stipa caudata (Pasto dulce)
  - Nassella laevissima (Hierba aguja)
  - Proustia pyrifolia (Tola blanca)
- Climbing plant**
- Proustia pyrifolia (Tola blanca)

### PROJECT TIMESCALE

	1 Year	3 Year	6 Year	10 Year
A. Ecosocial urban Corridor Manuel Bulnes	█	█	█	█
B. Linear Park Cerro Centinela	█	█	█	█
C. Corregidor axis corridor L. Norambuena	█	█	█	█
D. Corridor axis A. Reinaldo Barahona	█	█	█	█
E. Transition Square Víctor Domingo Silva	█	█	█	█
F. Los Perales Transition Square	█	█	█	█
G. Holanda Transition Square	█	█	█	█
H. Lookout Square Amapolas	█	█	█	█
I. Lookout Square Los Perales	█	█	█	█
J. Lookout Square Entre Quebradas	█	█	█	█
K. Lookout Square Bruselas	█	█	█	█
L. Lookout park Holanda	█	█	█	█
M. Interpretive trail Víctor Domingo Silva	█	█	█	█
N. Slope Manuel bulnes	█	█	█	█
O. Pùblic Square Víctor Domingo Silva	█	█	█	█
P. Public Square Quebrada Los Perales	█	█	█	█
Q. Public Square Bruselas	█	█	█	█
R. San Antonio De Las Bodegas Bikeway	█	█	█	█
S. Holanda Ecosocial Park	█	█	█	█

